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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/073,874	02/14/2002	Tsutomu Shoki	Q68554	6741

23373 7590 09/10/2003

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WASHINGTON, DC 20037

EXAMINER

ROSASCO, STEPHEN D

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 09/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/073,874

Applicant(s)

SHOKI ET AL.

Examiner

Stephen Rosasco

Art Unit

1756

-- **Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --**
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Detailed Action

The disclosure is objected to because of the following informalities: in the specification the intermediate layer is referred to as 13, but in the drawings it is labeled 23.

Appropriate correction is required.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mangat et al. (6,596,465) in view of Tong et al. (6,352,803).

The claimed invention is directed to a reflection mask blank for EUV exposure, comprising: a substrate; a multilayer film formed on the substrate to reflect EUV light an intermediate layer formed on the multilayer film; and an absorber layer formed on the intermediate layer to absorb the EUV light; the intermediate layer being formed by a material containing Cr and at least one element selected from the group consisting of N, O, and C.

And wherein the absorber layer is formed by a material containing Ta.

Mangat et al. teach a mask with a multilayer structure wherein the layer 260 is comprised of a material that is capable of absorbing or blocking EUV radiation such that the EUV radiation absorbed or blocked by layer 260 is not reflected by layer 220. As an example, layer 260 can be comprised of tantalum (Ta), tantalum silicon (TaSi), tantalum nitride (TaN), tantalum silicon nitride (TaSiN), chromium (Cr), chromium nitride (CrN), and chromium

oxynitride (CrON). Layer 250 serves as a repair buffer. Layer 240 serves as an etch stop to protect the underlying layers 230 and 220 during the patterning of overlying layer 250.

The teachings of Mangat et al. differ from those of the applicant in that the applicant teaches that the intermediate layer between the absorber and multilayer reflector is Cr and at least one element selected from the group consisting of N, O, and C.

Tong et al. teach a process for creating a mask substrate involving depositing: 1) a coating on one or both sides of a low thermal expansion material EUVL mask substrate to improve defect inspection, surface finishing, and defect levels.

The mask substrate, including: a single layer substrate composed of low thermal expansion material, at least one layer of material on a front side of said single layer substrate, and at least one layer of material on the back side of said single layer substrate.

And additionally including a layer of stress balancing material intermediate the front side of said substrate and said layer of material.

And wherein said layer of stress balancing material is composed of TaSi or chromium oxynitride.

It would have been obvious to one having ordinary skill in the art to take the teachings of Mangat et al. and combine them with the teachings of Tong et al. in order to make the claimed invention because it would be obvious to substitute the etch stop layer of Mangat et al. which is chromium with the layer of Tong et al. which is chromium oxynitride to appreciate the advantages of stress reduction which is a known problem when dealing at the EUV range.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Rosasco whose telephone number is (703) 308-4402.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661. Fax (703) 872-9310 Before Finals; 872-9311 After Finals.

A handwritten signature in black ink, appearing to read 'S. Rosasco', with a stylized, sweeping flourish extending from the end of the name.

S. Rosasco
Primary Examiner
Art Unit 1756

S. Rosasco
9/3/03